Family Forest Fish Passage Program

Barrier Evaluation Process - Cover Sheet

Purpose of Forms

The purpose of the Barrier Evaluation (BEF) and Expanded Barrier Evaluation (EBEF) forms are to document information on fish passage barriers submitted to the Family Forest Fish Passage Program. Washington Department of Fish & Wildlife (WDFW) will coordinate the data collection process for completing the forms. Data recorded on this form may be collected by a broad range of field staff, including: Conservation Districts, Department of Natural Resources (DNR), WDFW, Indian Tribes, Regional Fisheries Enhancement Groups (RFEG's), and others. The Fish Passage Team, a core group of staff from DNR, WDFW and Interagency Committee for Outdoor Recreation/ Salmon Recovery Funding Board (IAC), will summarize the data recorded on the EBEF's and use it to provide a prioritized list of projects to the DNR.

After the landowner has signed up under the program the **first step** is to determine if the structure is a fish passage barrier and if the stream is fish bearing. This initial determination is captured on the Barrier Evaluation Form (BEF) and sent in along with photos and a map. For the **second step**, the Fish Passage Team will screen the BEF. WDFW will coordinate development of the EBEF information including fish species and use, site information, and upstream and downstream channel conditions, approximate cost, correction options and potential habitat gain if the barrier was corrected. For the **final step**, DNR selects projects for funding based on the recommendation from the Fish Passage Team and a project agreement is developed between the landowner or eligible sponsor and the IAC/SRFB. If the project is not selected for funding it will remain on the list until it becomes a priority in the watershed and funding is available.

No substitute for local knowledge – How you can help:

Your help in providing information on a project is greatly appreciated. There is no better information source than a landowner or local habitat biologist who lives or works in a particular watershed. To minimize your workload, please only submit information that is readily available to you or that you have been asked to provide. The WDFW will develop maps of the watershed for each barrier listing the species utilizing the stream system, the amount of habitat opened above the barrier and the distance to the next man-made barrier or natural barrier gradient break. **Not all sections of this form need to be completed at one time or by one person. Please review the instructions for each section for further information on how and when to collect and record data.**

Form Descriptions

Barrier Evaluation Form (BEF) - Provides the basic information for identifying the location, landowner, evaluator contact information and the barrier measurements. The three key pieces of information are: 1) Is the stream fish bearing (anadromous or resident) 2) Is the structure a fish passage barrier (determined by the Washington State fish passage criteria) and 3) Is the applicant a family forest landowner using the program definition. The evaluator should have professional training to determine if the structure is a barrier and if the stream is fish bearing.

Expanded Barrier Evaluation Form (EBEF)

Part 1 – Provides background information on the local watershed. This includes upstream and downstream barriers, fish use at the site, and the description of the habitat that will be made available by the barrier correction.

Part 2 – Site visit documentation and correction alternatives. This section should be filled out by a professional field biologist or engineer with experience in fish passage design and implementation. The cost estimates and correction option are rough estimates for the purpose of setting funding priorities. Final design and implementation are subject to permitting requirements.

Instructions for Developing the Barrier Evaluation Forms – Following each form are instructions explaining the detail needed. If you have questions or need assistance please contact the Fish Passage Team. Primary contacts are Brett DeMond, WDFW (360) 902-2550, Brian Abbott, IAC (360) 902-2638, or Kirk Hanson (360) 902-1391 Program Guidelines are available by calling any of the primary contacts or on the web at: *http://www.iac.wa.gov/Documents/SRFB/Grants/FFFP_Program/fffpp_guidelines.pdf*

Note: The Fish Passage Team will summarize the information collected on a Summary Form that will include Lead Entity comments and other site-specific information. The completed forms will be made available to landowners and potential sponsors.

Family Forest Fish Passage Program: Barrier Evaluation Form

Location Information

Old FPA#:	New FPA#:	HPA#:
GPS Location: In decimal degrees using 9 decimal places. State Plane South, WGS84	Latitude:	Longitude:

¼ Section:	Section:	Township:	Range: ☐ East ☐ West
County:		Parcel:	
Stream Name:		WRIA#:	
Tributary To:		Stream #:	
Driving Directions:			

Landowner Information

Landowner Name:			Landowner Agent:		
Mailing Address:			Mailing Address:		
City:	State:	Zip:	City:	State:	Zip:
Phone:	Fax:		Phone:	Fax:	
Cell:	Email:		Cell:	Email:	

Investigator

Investigator Name:		Affiliation:	
Mailing Address:			
City:		State:	Zip:
Phone:	Fax:	Cell:	Email:

Barrier Measurements (in meters)

Is the stream fish bearing? ☐ Yes ☐ No ☐ Unknown Species, if known _____

Is this culvert a fish passage barrier? ☐ Yes ☐ No ☐ Unknown ☐ Level B needed

Level A analysis completed: ☐ Yes ☐ No If yes, attach. If no, complete below:

Shape:	Material:	Span/Diam:	Rise:	Water depth in culvert:	Length:

Streambed material throughout culvert: ☐ Yes ☐ No ☐ Unknown	Toe width (outside of culvert influence):
Outfall drop:	Culvert slope(%):
How did you calculate culvert slope? ☐ Handheld laser level ☐ Transit ☐ Other (describe)	
Road width:	Road fill height over top of culvert (D.S. end):
Velocity:	Apron: ☐ None ☐ Upstream ☐ Downstream ☐ Both

Problem with culvert: Outfall drop/Slope/Velocity/Depth: Percent Passability: ☐ 0% ☐33% ☐67% ☐ 100%

Comments:

Attachments

☐ Photos ☐ Level A Assessment ☐ Site Map ☐ Other ☐ Additional Comments

Send Form To: Fish Passage Team at OIAC, PO Box 40917, Olympia, WA 98504-0917

Instructions for Developing the Barrier Evaluation Form

Purpose of Form: Family Forest Fish Passage Program: Barrier Evaluation Form
The purpose of this form is to provide the DNR/WDFW/IAC Fish Passage Team with basic information for use in identifying high priority barriers for the Family Forest Fish Passage Program. It is the intent of the program to provide state dollars to replace those barriers causing the greatest harm to public resources and at the same time provide a systematic method for landowners to meet their obligations under the Forests and Fish Rules. For more information on the program, contact the Fish Passage Team at the address listed on the front of this form.

How to fill out this form
Following are definitions, descriptions, and standards for information to be included in the Barrier Evaluation Form. This form has five sections, which describe location, landowner, investigator, barrier measurements, and attachments.

General Location Information
This section describes the barrier location including GPS coordinates in decimal degrees using state plane coordinates, Washington South NAD27, stream name, and detailed driving directions to the site. Please provide the Forest Practice Application (FPA) number and the Hydraulic Project Approval (HPA) tracking number for the existing culvert if available. These documents assist in determining the level of cost-share required from the landowner. If a new FPA has been applied for, please include this number also.

Landowner Information
This section provides landowner contact information. If the landowner is working through a private consultant or other representative, please provide this contact information.

Investigator Information
Include the contact information of the person preparing the evaluation and making the initial barrier determination.

Barrier Measurements
Level A Analysis – This refers to the Washington State Department of Fish & Wildlife protocol described in ***Fish Passage Barrier and Surface Water Diversion Screening and Assessment and Prioritization Manual***, WDFW, August 2000.
Culvert Shape – Describe culvert shape (circular, rectangular, arch, elliptical, bottomless, or other).

Culvert Material – *Describe culvert material (corrugated metal, concrete, smooth plastic or metal).*
Culvert Size -

- Diameter: indicate diameter for circular culverts.
- Rise: indicate the dimension from culvert invert to crown of non-circular culverts.
- Span: indicate the maximum width of culvert for non-circular culverts.

Culvert Length - Indicate culvert length including aprons, if present.

Outfall Drop – Measured water surface to water surface.

Culvert Slope - Use standard survey methods to determine the horizontal length of the culvert including aprons, and the difference between its invert elevations expressed in a percent slope. If slope varies within culvert, provide the maximum reading. Describe the slope from the surveyed profile. Attach profile if available. Indicate which tool was used in determining culvert slope (Laser level, transit, other). To calculate % slope of the culvert use the following formula: (Upstream Invert Elevation – Downstream Invert Elevation / Culvert Length) * 100.

Stream Bed Material Within Culvert - Indicate whether streambed material is present inside the culvert.

Toe Width – The average width of the streambed (toe width). Measured outside the influence of the culvert. Used in conjunction with the culvert span to calculate Culvert Span to Streambed Width Ratio.

Road Width – Measurement should include shoulders.

Road Fill - Measure height of material from top of culvert to top of fill at downstream end.

Velocity – Field estimate of water velocity through the culvert in meters per second. Use flow meter or three-chip method. Informational. Optional.

Percent Passability – Based on professional judgment. Please discuss details in comments if a partial barrier.

Attachments. To aid in the evaluation and understanding of the barrier, please attach labeled photographs of the culvert site, including the culvert outfall and any other representative locations, with scale provided. Also attach a 1:12,000 topographic map of the project site, and the Level A assessment, and culvert survey profile, if available.

Comments: *Provide any additional information that should be considered such as: culvert condition, fish use/observation, and site conditions.*

Family Forest Fish Passage Program: Expanded Evaluation Form

Project Name:	IAC/SRFB Project #:

Part 1. Background Data Assessment

Attachments:

- ☐ Barrier Evaluation Form for project site
- ☐ Maps – (*map scale still under discussion*)
  - WAU map displaying other known barriers, fish use, gradient and basin area
  - WRIA map displaying other known barriers
- ☐ Surrogate PI #_____ (attach) ☐ PI# _____ (attach if available)

Watershed Information

Basin area: _____ Amount of habitat which would be made available upstream: _____(m)

Has a barrier inventory been conducted in the watershed? ☐ Yes ☐ No If yes, list source and date completed:

Are there downstream barriers? ☐ Yes ☐ No If yes, describe. List source; use separate sheet if necessary.

Are there upstream barriers? ☐ Yes ☐ No If yes, describe. List source; use separate sheet if necessary.

Has the stream been walked? ☐ Yes ☐ No If yes, information source:

Fish Species/Use

Mapped Species: ☐ bull trout/Dolly ☐ Chinook ☐ chum ☐ coho ☐ cutthroat ☐ pink ☐ resident trout ☐ sockeye ☐ steelhead

Information source:

Current fish use downstream and upstream from barrier (include source of information):

What species and life history stages might use the habitat made accessible by the project?:

Provide a qualitative description of habitat that will be made available by barrier correction, if available. Include source of information:

Part 2. Site Visit Documentation & Correction Alternatives

Site Information

Date of visit:	Recent precipitation:

☐ Photographs attached of barrier inlet and outfall, upstream habitat, downstream habitat, and road.

Bankfull width (outside of influence from the culvert):

Stream flow: ☐ Perennial ☐ Intermittent ☐ Unknown Source of information:

Flow conditions: ☐ low ☐ moderate ☐ high	Utilities crossing: ☐ Yes ☐ No ☐ Unknown

Road description/condition (mainline, spur road, driveway/access:

Fish observed on site:

Upstream Habitat/Channel

Approximate channel slope: _____% (outside of culvert influence)

Dominant substrate: ☐ sand (<.20") ☐ gravel (.20"–3") ☐ cobble (3"-12") ☐ boulder (>12") ☐ bedrock

Additional upstream information, habitat description, other site conditions or concerns:

Downstream Habitat/Channel

Approximate channel slope:_____% (outside of culvert influence)

Additional downstream information, habitat description, other site conditions or concerns:

Correction Alternatives

Alternatives to consider – Using your best professional judgment provide one, two, or even three alternatives to consider. Please recognize landowner desires or concerns, potential sponsor and their capabilities, and state fish passage requirements. Please see part 3 of this form for an example.

Alternative 1 –

Alternative 2 –

Alternative 3 -

Continued next page

Continued from previous page

General recommendation – Provide a one or two paragraph recommendation for this site. Note any special concerns discovered during the site visit. The purpose of this section is to provide the sponsor some guidance on the intended fix. Most small forest landowner projects should be relatively straightforward – however each site is different. In some situations a preliminary design may have already been completed or design concepts generated. If this is the case please include this information.

Please see the example in the next section

Rough cost estimate* - The purpose of the rough cost estimate is to provide a project specific estimate to establish a funding level for the program. Once project is selected for implementation a project agreement will be developed with the project sponsor at which time the cost estimate would be finalized.

Culvert Replacement – Alternative #___

Permitting/Oversight:	$
Engineering:	$
Materials:	$
Construction:	$
Total	**$**

* This estimate is provided as a rough approximation of project costs; actual costs will vary depending on specifications identified during project design.

Notes:

Instructions for developing the Expanded Barrier Evaluation Form

The purpose of this form is to provide additional information on potential high priority barriers for the Family Forest Fish Passage Cost-share Program. It is the intent of the program to provide state dollars to replace those barriers causing the greatest harm to public resources and at the same time provide a systematic method for landowners to meet their obligations under the Forest and Fish Agreement. A core group called the Fish Passage Team made up of staff from DNR, WDFW and IAC will compile the expanded application information and provide a prioritized list of project for DNR's use.

Following are definitions, descriptions, and standards for data to be included in the Expanded Barrier Evaluation Form (EBEF). This form has six sections which describe attachments, watershed information, fish species and use, site information, and upstream and downstream channel conditions.

Part 1. Background Data Assessment

This portion of the EBEF is to be completed in the office using available information. It will be used to make an initial assessment of the potential benefit of correcting the barrier based primarily on the number of fish species using the stream, and the amount of habitat which would be made accessible.

Attachments

- *Initial Barrier Evaluation Form* – This is the completed form previously submitted for the site.
- *Maps* – The Fish Passage Team will coordinate the development of a standard site map along with a larger scale watershed map.
- *Surrogate PI #* - This is the map-based Priority Index calculated for this project based on the EBEF data.
- *PI #* - A Priority Index should be provided if one is available.

Watershed Information

- *Basin area* - This is the area upstream from the project which is drained by this tributary.
- *Barrier inventory* – This indicates whether a barrier inventory has been conducted in the area.
- *Known Upstream and Downstream Barriers* - The purpose of this section is to provide documentation on the known upstream and downstream barriers. If barriers are present, indicate whether they are partial or total, if known. Discuss whether they are scheduled for correction, and if so, in what time frame. List the source of information.

Fish Species/Use:

- *Mapped species* – Check the box next to the species that are documented as utilizing the habitat. Include source of information.
- *Current fish use* – Describe any other available information regarding fish use upstream and downstream from the barrier; include information source.
- *Potential fish use* – Describe to the extent known which fish species and life stages would be expected to use the habitat made accessible by the project.
- *Qualitative habitat description* – Describe habitat quality upstream from the project to the extent known, and include information source.

Continued on next page

Continued from previous page

Part 2. Site Visit Documentation and Correction Alternatives

This portion of the EBEF will be completed for those projects which are determined to be of potential high benefit to fish resources based on the information provided in Part 1. The completed EBEF will be used to develop a prioritized list of projects to be presented to DNR for potential funding.

Site Information

- *Date of observation* – This is the date of the field visit.
- *Photographs* – The Fish Passage Team in coordination with local staff will photo document the site. Standard photos will include the barrier outfall and inlet, upstream habitat, downstream habitat, and road. Pictures should be clearly labeled describing what the photo is showing, and include scale.
- *Recent precipitation* – Describe recent weather events which may affect observed stream flow.
- *Bankfull width* - For the purpose of culvert design, the channel bed width is defined as the width of the bankfull channel. The bankfull channel is defined as the stage at which water just begins to overflow into the active flood plain. Bankfull width then requires a floodplain or a bench that is not present in many channels. In those cases, bankfull channel is determined by features that do not depend on a flood plain similar to those used in the description of active channel and ordinary high water (generally the lowest point at which perennial vegetation grows on the streambank).
- *Stream flow* – Provide a general assessment from local knowledge as to whether the stream flow at the site is perennial or intermittent and note whether it is spring fed.
- Flow conditions – This refers to the flow observed on the day of the visit.
- *Road description/condition* – Provide a brief description of the road surface, use, condition, etc..

***Fish observed on site* – Note any species and life stage of fish observed on site at the time of the field visit. This is a visual check of the stream.**

Upstream Habitat:

- *Approximate channel slope* – This is measured outside of the culvert influence.
- *Streambed material* - Identify the size and type of bed material present. Categorize it as: fines, sand, gravel, cobbles, boulders, bedrock etc..
- *Additional information* – Provide any additional upstream information that may be important to the project.

Example of a Correction Alternative – Approximate level of detail

Correction Alternatives

Alternatives to consider 1,2,3,…..etc….

Example

Alternative 1 – Abandon the spur road and pull the barrier culvert. This would be the least expensive of the options but would eliminate road access to approximately 12 acres on the south side of the property. The landowner is not interested in this.

Alternative 2 – Replace the existing barrier culvert with a round pipe 6 feet in diameter using the no slope option. Actual pipe size would be determined during the design process but based on the stream size and other factors a pipe diameter in this range should meet fish passage requirements.

General recommendation

This project is relatively straightforward. The stream is low gradient, less than 1.5 % throughout the reach. The stream is spring fed flowing year-round and supports a healthy population of coho and sea-run cutthroat. During the design process care should be taken in calculating high fish passage flow to select the proper culvert size and type that meets fish passage criteria. This is a relative large basin area for the size of the stream. During the site visit there was some evidence of high peak flows.

Basic engineering for the site is recommended. This should include a site plan and profile with preliminary culvert alignment, grade, size and shape, water surface profiles, road section, etc.. Stream slope calculations, Manning's equation calculations for low, high flow, 100 year flood for proposed culvert and stream sections should be included.

The purpose of this section is to provide the sponsor some guidance on the intended fix. Most small forest landowner projects should be relatively straightforward – however each site is different.

Rough cost estimate*:

Culvert Replacement – Alternative #2

Permitting/Oversight:	$ 5,000
Engineering:	$ 3,000
Materials:	$ 8,000
Construction:	$ 5,000
Total	**$21,000**

* This estimate is provided as a rough approximation of project costs; actual costs will vary depending on specifications identified during project design.

Family Forest Fish Passage Program: Summary Form

Project Name:	IAC/SRFB Project #:

Summary Form -

Project Sponsor_____

Lead Entity _____ WRIA #_____

☐ Surrogate PI #_____ (attach) ☐ PI# _____ (attach if available)

Project Description:

Amount of habitat which would be made available upstream: _____(m)

Has a barrier inventory been conducted in the watershed? ☐ Yes ☐ No

Are there downstream/upstream barriers? ☐ Yes ☐ No If yes describe:

Has the stream been walked? ☐ Yes ☐ No

Fish Species/Use

Species: ☐ bull trout/Dolly ☐ Chinook ☐ chum ☐ coho ☐ cutthroat
☐ pink ☐ resident trout ☐ sockeye ☐ steelhead

Current fish use downstream and upstream from barrier (include source of information):

What species and life history stages might use the habitat made accessible by the project?:

Provide a qualitative description of habitat that will be made available by barrier correction, if available. Include source of information:

Other Considerations

Lead Entity/Watershed priority:

Willing/Capable Sponsor:

Fish Passage Team Recommendation: